Water ethics on a human dominated planet:

rationality, context and values in global governance

Jeremy J. Schmidt

Post-doctoral Fellow, Anthropology, Harvard University

Email: jeremy.john.schmidt@gmail.com

Christiana Z. Peppard

Assistant Professor, Theology, Fordham University

Email: cpeppard@fordham.edu

ABSTRACT

A discourse on water ethics has emerged as a field linking practical water demands, social practices and hydrological constraints to philosophic norms. The field arose parallel to growing, global understandings of the interconnected nature of water management and governance challenges. As such, it has been inflected with issues and contests across a range of policy concerns – from holistic and integrated water management to economics, justice and human rights. The emerging water ethics discourse challenges both traditional environmental ethics and conventional approaches to resource management on issues of gender, power relations and ecological concerns. It suggests an alternate, place-specific approach for linking shared water concerns to normative contests.

INTRODUCTION

In his 1977 address to the Governor's Conference on the California Drought, Luna Leopold—son of noted ecologist Aldo Leopold—argued that the complex challenges of water management across climatic and geographic variability, economics, technology, politics and social customs required an ethical response, which he termed a "reverence for rivers."[1] Since then, ethical issues have taken on heightened importance in the realm of freshwater. The accelerated human appropriations of freshwater in the 20th century have been compounded by human perturbations to the climate and indicate that the hydrological cycle, while spatially and temporally variable, no longer persists within an envelope of stability.[2-3] Issues of equity in water distribution and access worldwide have arisen alongside historical and institutional norms, social practices, and the processes linking science to policy. Further, because *ought* implies *can* and water is (among other things) a decidedly material substance, practical constraints must be part of the conversation about normative aspirations regarding water supply, scarcity, treatment, access, and distribution. In this interdisciplinary yet distinct space—at the juncture of philosophical norms, social practices, hydrological constraints, and practical demands—a discourse on water ethics is rising.

This essay charts established and emerging discourses on water ethics in order to contribute to scholarly understandings of social, political and ecological challenges regarding inequalities in freshwater access and distribution. Such an inquiry is important because studies of hydrology reveal a complex and finite freshwater supply while demand for freshwater continues to accelerate. Contests over freshwater across multiple sectors and populations have moral consequences for human relationships and the conditions for ecological health. In this context it is necessary to resist the tendency to bury value judgments in the language of expediency or

crisis. In the section *The Conceptual Terrain* we introduce the general, Western, 20th century terrain within which idea of water ethics began to take a persistent shape. Then, in the section *Water Governance, Ethics and Global Sensibilities* we specify how water ethics arose in conjunction with sensibilities that freshwater problems were in some sense global, even universal, and amenable to objective, rational forms of management. From there, the section on *Facts, Values and Freshwater* considers how particular demands of scarcity, specific claims regarding the value of water, and requirements of justice have simultaneously challenged and reinforced certain aspects of that emerging sensibility; and we suggest alternate modes of articulating and coordinating responses. We conclude with a section on *The Upshot: the Future of Water Ethics Discourses*. There we consider several insights that have emerged from water ethics discourse and identify major trajectories and themes for water ethics going forward.

I. THE CONCEPTUAL TERRAIN

Environmental philosopher Michael Nelson once remarked that water existed in a "metaphysical blindspot" in ethics.[4] This seems a remarkable oversight, since water is vital to all human endeavors and relationships at multiple scales, and since ethics is concerned with what human beings ought or ought not do. Whence the oversight in Western forms of ethical discourse?

Classically understood, ethics and morals (from the Greek and Latin, respectively) are not merely accounts of acceptable or unacceptable social mores, practices and rules but also appraisals of reasons to take certain actions and not others. These concerns were, and often still are, supported by a Western model of what it means to be rational, the key tenets of which are

universality and necessity.[5] Universality holds that individuals confronted with the same facts and employing the same premises will reach the same conclusion, provided they make no logical mistakes. Necessity forms the basis for *why* they reach the same conclusion—that is, why rational agreement is not merely a chance outcome but rather an accessible, viable possibility for any person or group.

Rational approaches to ethics, especially those that privileged thought over experience or over embodied, practical reason, have been criticized both from within normative Western discourse and from its edges. For example, Jeremy Bentham argued in the 18th century that the key moral criterion was not rationality or even unique human agency, but the capacity to suffer.[6] Albert Schweitzer followed a Darwinian impulse to argue that "reverence for life" was required to respect the evolutionary will to live wherever it was found.[7,8] Throughout the mid- to late-20th-century, feminist and post-colonial scholars demonstrated how claims about "rationality" are culturally-specific and, when mobilized in ethics, often inscribe norms that exclude women, non-western peoples, other species, and nature in general from due consideration.[9-12] As such, universality and necessity came to be seen as arising from situated power relationships that privileged a culturally contingent model of a rational, upper-class (usually white) male.[13-15]

In sum, "metaphysical blindspots" in western ethics have not been unique to water. Rather, water is symptomatic of more general deficiencies that have at least as much to do with *how* ethics was being done and by whom as with *what* are identified as topics of concern. Some of these deficiencies persisted into the 1970s, when the field of environmental philosophy and ethics emerged. Even there, water was rarely treated explicitly. Instead, key debates centered on notions of intrinsic value and critiques of anthropocentrism (the view that all and only humans count morally).[16] The emphasis on intrinsic value was duly critiqued as expanding western

concepts of value to ideas of "wilderness" that fit a western imagination beset by a nature/culture binary.[17,18] Eventually, environmental philosophy appeared somewhat disconnected from practical policy problems.[19] These and other concerns prompted a subset of environmental philosophers to advance eco-feminist theories and practices and pragmatist views of philosophy and ethics.[20] Environmental pragmatism, like ecofeminism, augments any disembodied criteria of rationality with the significance of experience as a basis for normative legitimacy; as such, it avails itself of actual historical communities that, through their practices, institutions and policies, have codified shared experiences into standards through which to judge acceptable or unacceptable actions.[18, 20] These theorists quickly turned to the case of fresh water, where they found a discourse on water ethics had already begun forming apart from mainstream environmental ethics, especially within the context of water scarcity (described in Section II).[21-22]

What is "water ethics"? One definition of a water ethic is "a normative framework guiding actions that affect water."[23] In this review, we do not claim there is a single, unified water ethics discourse but instead use the term to reflect an array of interdisciplinary reflections, suggestions, observations, worries and principles. Our suggestion is that there are always multiple normative frameworks in play: water ethics are inherently plural. Still, in our view, there are also non-negotiable points of departure. First, freshwater is essential for life, a *sine qua non* for existence. Second, water is *sui generis*—the kind of thing for which there is no substitute. Water's essential, irreplaceable characteristics condition profound, fecund communities of life. Yet increasingly in the globalized, 21st century, freshwater is also often contested politically and philosophically. Indeed, water can be thought of as a "total social fact" in recognition of how expressions in one domain, such as economics or religion, affect numerous other institutions of social life.[24] Further, there is often a looping effect between what are

considered to be concrete options and the deeply held meanings of water that fit the contours, practices and identities held by members of different communities.[25-27]

Given these deep interconnections, how can a literature review address the diverse moral and material orders made possible by water? Our approach is to treat different claims about what water is as codifications—not justifications—for the acceptance of norms. We consider norms not as derived from *a priori* justifications of value but from the practices, institutions and rules that codify certain ways of living and forming shared meanings. This approach resonates broadly with ecofeminist and pragmatist approaches while drawing on other philosophical paradigms and is explained further in what follows. Such an approach is not tantamount to ethical relativism: it is 21st century realism regarding hydrology and the contextual demands to achieve justice on a planet increasingly dominated by human action.

II. WATER GOVERNANCE, ETHICS AND GLOBAL SENSIBILITIES

Water ethics discourses arose parallel to growing awareness that human activity was impacting Earth at a planetary scale. Since the 1977 United Nations Conference on Water in Mar del Plata, Argentina there has been an effort to develop principles and practices for what is now known as global water governance. These began with Rational Planning, which sought comprehensive management plans supported by laws and regulation.[28] This approach faltered due to institutional fragmentation and because what is rational for one constituency may not be for others.[29,30] By the 1990s integrated water resources management (IWRM) arose as a holistic framework to maximize social and economic benefits from water without compromising vital ecosystems.[31] During this period experts increasingly remarked that water management challenges were partly

due to ethical deficiencies.[32,33] These ethical calls had a dual focus. First, they sought to confront what Conca described as the 20th century mantra of "pushing rivers around" through infrastructure-intensive development.[34] The norms legitimating such developments came to be seen as contributing to, if not creating, water crises.[35] Second, critics of IWRM focused on what was seen as a primarily technical response to water scarcity. These concerns shaped the water ethics discourse across four registers.

The first register operated in reference to a pervasive trope: that good water management is coincidental with social progress. While numerous historical studies link the rise and fall of civilizations and nations to water management,[36-39] recent work has detailed how post-WWII water management was linked to the project of international development and the promotion of liberal, democratic norms of progress.[40-41] In many cases Western expertise was deployed to engineer a fit between water, development and social order.[42-44] American norms underwrote much of this agenda based on achieving "the greatest good to the greatest number for the longest time."[45,46] This hydraulic-utilitarian ethos became an international norm.[47] It also provided an implicit recognition that, since the greatest good depends on the consequences of distinct actions, something can be good at one time or place but not in another.

The malleability of hydraulic utilitarianism helps to explain why it became the default ethic at Mar del Plata and persisted in the rise of IWRM.[33,48,49] The history and controversy over IWRM is not the specific concern here;[50-54] rather, the critical point is that IWRM held an implicit ethical position in its assumption that all values are commensurable once seen in utilitarian, consequentialist terms. Thus, IWRM was not merely a technical endeavor but a value-laden paradigm with implications for water planning and policy. Indeed, IWRM buried the norms of a particular political community (the one choosing IWRM) within the conditions for

participating in water management. A key manifestation of this dynamic emerged with the tension between public and private rights to water—the second register we consider.

The tension between public versus private water rights and governance arose and persisted in reference to the four Dublin Principles adopted in preparation for the 1992 Conference on Environment and Development in Rio de Janeiro. The first three principles focus, respectively, on: recognizing water's finite nature; developing participatory approaches to management; and enhancing the position of women.[55] The fourth principle declared water an economic good that had economic value in all of its competing uses. The claim was not that water was *only* an economic good, yet its articulation crystallized a growing debate. On the one side, water was taken as a social good that uniquely conditioned the public interest and that should therefore be equitably administered on principles of reciprocity, value pluralism, accommodation of diversity, good faith and in view of future generations.[22] On this view, individuals may hold water rights, but customary water uses generated community-level values and welfare of such importance that states are understood as having a responsibility to safeguard public interests and oversee the transfer of water rights.[56-59] On the other side of the debate were those who believed in the power of markets to enhance flexibility, increase efficiency, and resolve political disputes over scarce water resources.[60-62] The key tension was not whether water had economic value (a position few deny) but rather how economic values, and the property rights upon which economic processes rely, may conflict with other social values and relations.[63] In the early 21st century, the public/private distinction ossified into a debate between privatization versus the human right to water (see Section III).[64, 65]

A third important register of late-20th century water management was procedural: an attempt to circumscribe social and cultural difference through mechanisms of public

participation.[66,67] In this "procedural turn," governments seek (though do not achieve) neutrality with respect to the substantive goods held by different groups.[68] The promise of a participatory frame lies in the premise that fair procedures will produce fair outcomes.[69,70] This approach aims to replace rationalist, top-down policies with mechanisms that create the conditions for stakeholder participation and decision-making. This emphasis fit broadly with a role for governments as "setting the rules" rather than actively managing decisions, and it aligned with the shift in emphasis from "government to governance" in environmental discourse.[71] In such manner, a UNESCO working group on the ethics of freshwater struck in 1997 offered a normative foundation for the participatory ideals of IWRM.[72]

Subsequent publications at the international level amplified these tendencies. In 2004, UNESCO published surveys of the ethical issues arising across many of the governance domains IWRM encountered—agriculture, gender, ecology, groundwater, institutions and several others—with an overview chapter that explicitly distanced itself from environmental ethics.[73] In 2006, the United Nations World Water Development Report linked the project of development, and especially the management of scarce freshwater, to issues of human and international security.[74] The convergence of concerns about managing water *scarcity* and addressing water *security* was intensified when several prominent hydrologists rejected the long-standing assumption of stationarity (the idea that inter-annual hydrologic variability fluctuates within an overall envelope of stability) due to anthropogenic climate change.[3] The implications for management and governance were significant: Without a predictable "natural framework" for the global hydrologic cycle on which policy norms could reasonably rely, ideals of centralized management and governance were rendered unstable.[75]

These themes of feedback from human actions onto water systems, the concern about security, and the management of scarcity refracted back into water ethics discourse and opened the door to alternative management styles, such as adaptive management (discussed in the Conclusion). In 2009 and 2010, two compendiums on water ethics were published that focused, respectively, on practical issues and philosophical challenges in management and governance.[76,77] Philosophical views tended to prioritize securing water to recover natural, ecosystemic processes, while adapting human norms to that task; the corresponding ethic leaned towards precaution against excessive human uses of water in light of hydrologic uncertainty.[78] This approach set up hard choices about which uses to curtail and whose norms should be deployed to make such decisions.[79] Practical approaches, on the other hand, suggested that because the boundary between "nature"' and "society" has been so robustly punctured in the past several hundred years,[80] the goal should be to enhance human welfare by managing the water aspects of ecosystem services and cultivating broader notions of solidarity.[81-83] It remains unclear, however, how competing cultural imaginings of "solidarity" fit with the stock-and-flow models used to value ecosystem services.[84,85]

These contestations raise a fourth register for water ethics: How should theorists and practitioners proceed if a "natural" hydrologic or ecosystemic framework for integration is no longer tenable? This question becomes increasingly significant as industrialized human societies generate feedbacks that force planetary systems to adapt to human activities.[86-88] One approach has been to emphasize the "hydrosocial cycle." This discourse describes and critiques how 20th century water management policies valorized scientific norms that effectively reduced water to chemical-molecular understandings (i.e., H_2O) without reference to social practices.[89] By exploring how water exists, is represented and known within social worlds, proponents of the

hydrosocial cycle offer an important corrective to the assumption that water exists only "naturally" (i.e. free of human influence or the politics of representation).[90-92] The hydrosocial critique suggests that, in fact, the reduction of water to H_2O was part of late 19th and early 20th century state-making: it created the conditions for the era of pushing rivers around, and thus for maximizing economic benefit and consolidating state power.[93,94]

These claims inform and resonate with water ethics discourse, since values affecting water, including those linking environmental science to policy, are always positioned with respect to historical, political and social relations.[95] Scholars now understand that a (Western) set of cultural assumptions about water policy norms has informed and shaped water management across a range of scales and registers.[96] Several recent collections, including a roundtable in *Water Policy* and monographs on water ethics, have sought to link these broader historical dynamics with attention to how culturally-bound value judgments manifest in policies.[97-100] Attunement to these dimensions will be critical as water ethics engage ongoing dynamics of globalization and fresh water scarcity.[101] What, then, are possibilities and implications for understanding water in relation to different cultural histories, cosmologies, social worlds and material realities—and for advancing water ethics discourses in the 21st century?[102-105]

III. FACTS, VALUES AND FRESHWATER

The modernist furor over massive hydraulic infrastructure provided fertile ground for the emergence of water ethics, but there is more to be said. This section turns to the impact of re-scaled and longitudinal data sets that have rendered standard, 20th century assumptions about the availability and distribution of fresh water more complex. It also demonstrates how the

development of hydrosocial and social scientific analyses inform discussions of governance and water ethics, and it foregrounds much emerging, constructive work from pragmatist and feminist perspectives. Finally, we link trends in water ethics discourse worldwide through the concepts of value and justice.

Ways of fact making

Perhaps the most significant change in late 20th century understandings of freshwater was the suggestion that water, once thought to be infinitely renewable, was "as finite as many other resources."[23] The crucial studies by Shiklomanov and others enhanced recognition across a range of water-related disciplines that only a limited percentage of the earth's water is fresh, surface water (0.3%), while the majority is glaciers and snowpack (70%) and a significant minority is groundwater (30%).[106] While that information is fairly well known, what has become clearer is that not all types of water are equally accessible or renewable, and not all uses have consistently predictable effects on watersheds.[88,107,108] Moreover, recent mapping of aquifer levels through satellite and sonar demonstrates that rates of groundwater recharge do not match the rates of withdrawal in many places worldwide.[109-111] Aggregated longitudinal data and refined models of climate change impacts demonstrate that fast melts of glaciers and snowpack will lead to floods in the short term and, eventually, to diminished freshwater supply in the long-term.[112] In addition, increased growth of populations and economies continues to correlate with amplified water demand and withdrawals (for uses both consumptive and non-consumptive) in many cities and agricultural areas, while the off-shoring of manufacturing shifts water demands spatially in a global economy.[113]

A major conceptual and practical hurdle for discourse on water ethics is that while water is a universal prerequisite for the life of individuals, societies, ecosystems, and civilizations, it is by no means uniform. Consequently, global discourses on water ethics are positioned at an intersection of claims about the Earth's material realities and those of particular social worlds. In such a milieu, the classical distinction between facts and values is blurred, perhaps untenable.[114] Alternately, the naturalistic fallacy—that "is" implies "ought"—is troubled by the material realities of limited water and the moral implications thereof.[115] Climate change and its hydrological and social impacts increasingly inform global and regional conversations about fresh water and the uses to which it is, or should be, put.[116,117] These regional conversations confront the normative positions of national claims to water and are increasingly entangled with broader discourses of security: For instance, fresh water scarcity is frequently counted a potential factor in transnational conflict given the 276 river basins that crisscross national borders.[118] While media reports of water scarcity frequently exhibit a sensationalist flair regarding "water wars," Wolf argues that armed conflict can be avoided precisely because fresh water is a fundamental concern around which many nations and communities continue to find shared solutions.[107,119-121] Yet internationally as well as sub-nationally, drought, desertification and deluge form combinations of displacement and dispossession that affect human security and create environmental refugees. In any case, the multiple scales at which issues of security arise suggest that nation-states will continue to occupy a key role in preventing conflicts and maintaining integral relationships between human and planetary health within and beyond national borders. This link between sovereignty and the governance of water resonates with claims regarding rights and justice (discussed below).

Ways of valuing

An important development in water ethics discourse has been to reposition and more perspicuously discern the question of water's economic value. Ostrom and colleagues' game theoretic modification of Hardin's "tragedy of the commons" hypothesis positioned fresh water with respect to social and institutional norms—even if they maintained Western assumptions about rationality and human agency.[122,123] Since then, several economists have demonstrated many different failures of "fit" between environmental goods (especially freshwater) and classical, neo-liberal economic theory and market practice in capitalist systems.[124-126] Some theorists express confidence in the ability of the dominant capitalist exchange system to ameliorate from within its worst environmental externalities (for example, by adjusting discount rates or accounting for natural capital).[127,128] Others are skeptical: for example, ecological reinterpretations of classical capitalist critiques specify the inherent, destructive dynamics that accompany capitalist systems of production and exchange.[129] Stiglitz and Speth have independently observed that a revolution in values must take root.[130-133] Put broadly, the flourishing of human beings and ecosystems has been identified as an ethical value in ways that have significant implications for the articulation of fresh water ethics. This is perhaps seen most clearly in the controversy between economics and the articulation of fresh water as a human right.

The human right to water and sanitation was adopted in 2010 by the United Nations. According to the U.N., freshwater was not mentioned explicitly in the 1948 Declaration of Human Rights because, "like air, it was considered so fundamental that its explicit inclusion was thought unnecessary."[134] Its adoption in 2010 was heralded as "an idea whose time has come" by activists who have created new networks across NGOs, municipalities and civil society in ways

that disrupt state-led models of IWRM, globalization and the commodification of water.[135-138] The idea of a human right to water has also resonated with some cultural and religious claims to the integrity of human life; the Roman Catholic Church, for example, now endorses the right to water as a "right-to-life" issue.[139] And in its linkages to sanitation and WASH campaigns as well as Millennium Development Goals (i.e. 7c), the language of water as a human right has amplified attention to differential burdens due to gender and poverty.

While "rights" discourse is important for raising awareness of the ways in which freshwater is a universal human need, it also entails a number of practical and philosophical problems when the privatization/rights binary forestalls ethical debate.[140] For instance, a single category of "rights" can obscure how multiple spheres of value may affect how different versions of local, national or international rights are used to secure social goods.[64] Moreover, it has become clear that the "right to water" does not necessarily preclude the capitalist or privatization models that many water justice advocates had hoped it would; ironically, the ability to provide or achieve the human right is often claimed to be delivered best by the private sector.[141] Even while the language of "right to water" has compelling communicative power for diverse communities, the differential deployments of the concept put forward a variety of (sometimes conflicting) moral visions of the good life and mechanisms of water provision and distribution.

There are also problems of cultural bias. Human rights discourse casts the conversation about water and ethics within individualist, liberal, Western discourses.[142,143] This bias suggests that the debate over water as a human right has lacked historical, geographic, and scalar perspicuity—such as how imaginings of "public water" can be deeply interwoven among particular communities, government financing, international development and regional hydrology.[43] Moreover, the multiple moral and material dimensions of freshwater raise questions

of which political constituencies, customary traditions, and spheres of value are entailed within—or left out of—different conceptions of rights.[144-146] This critique is not unique to the human right to water: It is a species of broader ethical debates regarding the specific, cultural histories of contemporary normative frameworks, as well as theoretical presumptions about universality.

At present, these fissures are becoming evident especially through scholarly discourses in cultural anthropology, environmental sociology, and religious studies, where gender and power represent two major, emergent themes with regard to human rights, injustice, and environmental degradation.[25,27,65,97,144-147] The linkage between "women" and "water" under existing power constellations is a particularly potent site for consideration of contemporary social and environmental justice. It is now well established that women tend to disproportionately bear the burdens associated with access and distribution of water—for example, as water-gatherers who spend their time carrying the heavy liquid rather than going to school or engaging in forms of economic activity.[148,149] This is, of course, a pragmatic issue for policymakers and development groups, many of whom have observed that gender equity and the education of girls and women are positively correlated with economic development. But the issue of gender and water is not merely extrinsic to other goods (such as economic development): it is a justice issue in and of itself that deserves to be central to the water ethics discourse, not rendered epiphenomenal or instrumental to achieving other ends. In this regard, eco-feminist approaches to water, human bodies, social relations and ecology present a particularly rich area for water ethics.[13, 150,151]

Another fissure in rights rhetoric pertains to indigenous and (broadly-speaking) non-Western communities, who rightly point out that their legal and social norms do not seamlessly fit Western, secular ideals of sovereignty, subjectivity, legitimacy, or community.[152-155] These

objections can therefore also be seen as forms of claims to community autonomy and social and environmental justice. Increasingly, such claims have come into conflict with globally-oriented scientific registers: For example, some have judged that empirical claims about anthropogenic climate change are superior to indigenous claims to the human right to water, precisely *because* anthropogenic climate change renders global hydrology too uncertain to specify claims.[156] Such difficulties have led to suggestions that the "right to water" is not best viewed as a solution to water conflicts, but rather as a way of framing the commons versus commodity debate, and thus as one strategy (among several) for generating a context in which to find solutions.[143] Others have queried whether conceptions and critiques of "the commons" have captured the nuanced ways in which different scales of political advocacy align with different understandings of moral goods when it comes to articulating the human right to water.[141,158] Still, many scholars concede with Bluemel that while a human right to water has a certain conceptual and political utility, "its implementation is fraught with difficulties."[157]

Arguments for the legitimacy of alternative metaphysical, ontological, and ethical claims regarding freshwater are increasingly recognized both within and beyond Western conceptions of rights.[146] Strang has recently argued that indigenous groups in Aotearoa/New Zealand have a legitimate claim to water-based cultural self-determination because their conceptions of water are "not merely attempts to assert prior rights of ownership and managerial responsibility" but are also a form of ideological and political critique of colonization.[159] In a similar way, a prominent example of broad-based mobilization of social, cultural, and religious understandings of environmental value that critiques colonial mentalities and extends beyond the standard rights paradigm can be found in the "Declaration of the Rights of Mother Earth," a statement that was adopted in 2010 by the World People's Conference on Climate Change. This document

represents a broad-based attempt to ameliorate the inherent anthropocentrism of Western human rights paradigms and to attend to the ecological destruction wrought by industrialization and economic globalization. The Declaration claims that certain kinds of entitlements are due to the Earth, "without distinction of any kind, such as may be made between organic and inorganic beings, species, origin, use to human beings, or any other status" and that the Earth has a right "to regenerate its bio-capacity and to continue its vital cycles and processes free from human disruptions."[160] In such ways, the Declaration resonates with the environmental philosophy of Deep Ecology and the ethical claim of biocentric egalitarianism, in which the Earth—as an autopoetic system that provides the conditions of possibility of human life—deserves protection of its life-facilitating systems, independent of direct human benefit.

In sum, arguments for and against the human right to water raise critical issues for water ethics at a conceptual and practical level. This is likely to continue as a key site of contest, and ongoing scholarly attention to how different legal and political discourses articulate the ethics of social and environmental relations is greatly needed.

Water ethics for the 21st century

The water ethics discourse continues to grapple with the consequences of 20th century confidence in rational objectivity, progress, and universal norms. Water ethics in the 21st century must attend methodologically to how values come from somewhere and how these sites (both geographic and conceptual) must be identified with greater precision in pursuit of understanding how norms are codified, with what social and empirical presumptions, and towards what ends. Here, we suggest that water ethics discourses could profitably learn from and integrate the work of environmental pragmatists and feminist theorists, who exhibit a productive tension between rigorous analysis

and contextually nuanced appreciation of the vagaries of "sovereign spaces" in light of dynamics of gender and power. Indeed, eco-feminists have long argued that ethics should be informed by the experiences of gendered bodies and the systems that sustain and justify ongoing relations of oppression and degradation. This method and focus takes on particular significance in the context of freshwater,[12-14] where issues of gender and power pertain not only to women (or scholars who identify as women); instead, they illuminate to deep themes that persist globally as actual communities trouble dualistic framings of gender, modernity, secularism and other assumptions. Moreover, there is an epistemic point for scholars theorizing water ethics: Feminist and ecofeminist philosophers have long recognized that theorists and practitioners cannot escape our own entanglements, but we can learn to claim our biases and theorize key principles and norms better in light of them.[12,150] Such premises can and should inform the variety of water ethics discourses now in circulation.

Scholars interested in water ethics would also do well to attend to concrete examples of genre-stretching reflection on water outside of academic discourse or public policy work—ranging, for example, from the place-based artistic work of artist Basia Irland, to the photography and documentary films of Edward Burtynsky, to the environmental landscape critique by Kate Orff and Richard Misrach, the essays of Ivan Illich (who famously refused "to reduce all waters to H_2O"), or the place-based meditations of authors seeking to work out norms that have a form of specificity regarding why *these* places are important for *these* values.[161-168] Such renderings are not always ethical in a formal, Western, philosophical sense. They are, rather, engagements with aesthetic judgments—what Arendt described as cultivating our public, common sense through the shared experiences that shape social imaginaries. From those, we can extrapolate to better understand water discourses.[169] Examples of such social imaginaries and

communities include the Water Ethics Network (www.waterethics.org) and other collaborations enabled by new forms of social media and water information aggregation. Attention to these alternate registers, which range across multiple institutions of social life, will be crucial to ameliorating metaphysical blindspots within and beyond the realm of freshwater.

IV. THE UPSHOT: THE FUTURE OF WATER ETHICS DISCOURSES

Claims that contemporary human beings now live on a human-dominated planet are increasingly captured in the terminology of the "Anthropocene," which marks both a set of scientific considerations regarding the geologic force of humans and an implied challenge of "planetary stewardship."[170] As this literature review has expressed, we enter this human-conditioned epoch on an uneven trajectory set by particular visions of social progress and the derivative political, social and ethical norms affecting freshwater. As appreciation of the impacts of human activity on Earth systems grows, there are important questions to be asked about how water ethics intersects with broader philosophical and political ethics of nature, the environment, or sustainability.

Fresh water is a slippery substance to theorize. This review has attempted to demonstrate how ethical reflection on water and its multiplicities has occurred across various disciplines and contexts that seek to capture water's resolutely material dimensions as well as a range of theoretical registers and cultural inflections within which it is often rendered. Can water ethics discourses attain coherence in the face of such multiplicity? Frankly, we doubt there is any general water ethic that can be specified absolutely for all circumstances. Only in the interplay of grounding principles and their pragmatic mobilization in specific contexts can a viable water

ethic be articulated. However, we do insist that several guiding principles may serve as the skeleton of an ethic that always remains to be enfleshed. First, freshwater is both *sui generis* and *sine qua non*. Second, freshwater is always contextual in that it is subject to various factors of hydrology and geography, cultural norms, legal paradigms, technological interventions, and policy frameworks. This dynamic enterprise is, and will continue to be, characterized by moral and ethical bricolage and ongoing discernment of how norms and contexts intersect.[77,171] For the foreseeable future, environmental justice will continue to be a major theme—especially in the registers of gender, colonialism, and uneven distribution of economic and material burdens and benefits.

Water management and the material-metric-moral overlap

The facts of fresh water scarcity, consumption, and access are simultaneously scientific and social. The identification of water management quandaries, including the kinds of data used to account for them, are linked to moral and material imaginations that affect management and governance norms as well as research trajectories in environmental science.[172] As Section III indicated, scalar and longitudinal developments in data gathering and meta-analysis continue to prompt reflection on how human histories are linked to broader climatic and hydro-climatic records as well as likely future scenarios.[173] Accounts that link such data to macro-scale aspects of political economy (such as water subsidies or hydraulic diversions for industrial agriculture) must be understood as producing a moral imagination alongside material claims. On a different scale, practical observations and re-evaluations of social norms for everyday domestic water use practices can overlap with ethical discernment and practical policy goals (such as improving aquatic health).[174] One of the vexing and important questions for 21st-century water ethics is to

ask whether and how the macro (political economy) and micro (individual or community use) frames intersect: exploring, for example, the implications of the global trends and global climatic data for particular locations, or the possibilities of local water use practices for generating scalable, sustainable solutions to water shortages and conflicts. Pressures deriving from urbanization, the demise of wetlands, and the needs for improvements, perhaps even visionary new approaches to sanitation and wastewater systems are practical contexts that could benefit from such an approach. In other words, the moral aspects by which global and local communities relate to freshwater, the practical political demands and infrastructure for water, and the metrics and paradigms within which societies adjudicate what counts as relevant data and legitimate political action will together shape water futures.

Procedures, norms, and vulnerable and marginalized populations

A second concern for 21st century water ethics is with respect to historically marginalized groups, including how water's differential burdens intersect and correlate with power, gender and poverty. As noted in Section III, the disproportionate burdens born by women vis-à-vis fresh water scarcity must be addressed at political levels. More broadly, it is insufficient to create participatory procedures within broader power structures that reproduce dynamics of privilege without confronting how procedural norms and established categories curtail the formulation of legitimate alternatives to those norms.[175] In particular, how is the moral content of laws or international mandates, such as the human right to water, filled out by competing groups and with differential effects? Responses to these challenges should include arguments appraising new *kinds* of rights, such as those to a healthy environment, those attentive to the economic and gender differentials in water access, and those of alternate legal traditions.[176]

Practical reason and the pursuit of "water virtue"

While the idea of environmental virtue ethics is not new, recently the cultivation of "water virtues" has been part of several calls for water ethics that identify the characteristics and dispositions of individuals and societies as a way of cultivating wisdom and discernment in complex scenarios.[177] More specifically, attention to how social relationships maintain identities over time and cultivate attitudes towards both gradual and punctuated change will be critical for understanding the place-based nature of water values, especially in the realm of hydraulic and technological innovation. Ethical attention to practical reason, discernment, and virtue will be likely centers of contestation and debate as regnant IWRM paradigms are replaced by considerations of a climate-water-energy-food "nexus" that is intractably connected with technological forms of material and social reproduction.

Technology remains a massive ethical question and political strategy for freshwater, especially when there are implications for surface and groundwater. Indeed, the benefits, burdens, intended and unintended consequences of technological innovation and intervention in an era of freshwater scarcity are manifold. Examples include the layered moral geographies produced by Green Revolution agricultural technologies and metrics that persist to this day; or the "duty of water" adapted from uses of water for steam-engines to agriculture and the irrigation practices that produce particular landscapes.[178,179] Another example is mining and fossil fuel extraction procedures, for which complex surface, groundwater, toxicological, technological and geological factors are too complicated and locally consequential for command-and-control approaches, on the one hand, or industry self-regulation, on the other.[180] The question of desalination will continue raise a host of issues and represents an expansion of freshwater ethics

into the brackish, murky terrain of appropriate human relations with oceans. Finally, the rapid urbanization of human populations requires new appreciations of how cities place demands on watersheds and (where available) aging subterranean water infrastructure.[181-182] Water re-use and nutrient (sewage) recycling represent major growth areas for technological innovation, urban design, and profit. Such issues are ripe points of entry for water ethics. As such, water ethics need not begin with the presumption of purity or pristine environments: rather, it can begin with crowded physical and political landscapes that bear the marks of previous development and management programs, and are resolutely place-based.

Adaptive water management and ethical judgment

This review has demonstrated how the modernist ideal of ordering all of the competing factors affecting water management under a single (putatively neutral or objective) schema is suspect. Luna Leopold had already intuited as much with his 1977 exhortation to demonstrate a "reverence for rivers." But his claim also implies that all human beings—whether or not we realize it—exist within conceptual schema that support particular moral and material understandings of water and its management. Our treatment of the literature has attempted to chart the variety of contexts and forms in which freshwater ethics have articulated how practical and moral judgments are linked to multiple variables within changing understandings of global water governance. With this in mind, responsive dimensions of water management in light of environmental data can also be seen in adaptive management, which augments the holistic rationality of IWRM with attention to how social and ecological systems are characterized by change rather than stability.[183]

Fittingly, adaptive management is an experimental, place-based approach to environmental policy that has long recognized the influence of Luna's father, Aldo Leopold, and his call for a new ethic for environmental management.[184] Some environmental philosophers claim that Leopold was, in fact, the first adaptive manager—and that his pragmatism offers a valuable way to link experimental policies, place-based values and social learning.[185] But an invocation of Aldo Leopold's work and legacy extends also to the need for virtues grounded in an aesthetic of care and justice, and not mere expediency. Certainly, such ideas are consonant with recent calls for reflexive approaches to values in water governance, the demands for equity in global contexts, the attention to cultural difference, hydrologic uncertainty and the demands of living increasingly urbanized contexts under conditions of water scarcity.[186-189]

In Leopold's "land ethic," the experience of paying attention to context and the pursuit of healthy ecological relationships does not manifest as a rote application of pre-established ethical algorithms nor blind faith in social or natural sciences of progress. Nor is ecological ethics merely the expansion of the sphere of moral consideration within extant paradigms. Instead, for Leopold, a land ethic involves *reshaping* ethics in light of ecological insights and grounded praxis.[190,191] The upshot then—as now—is that ethical discourse itself needs to evolve with ecological knowledge and practical wisdom. Whether in relation to epistemological premises or the question of ultimate ends, in the 21st century, water ethics can be considered just such a form of ethical discourse: a challenge to adapt to the emerging realities of living on a human-dominated planet, and doing so as if we are here to stay.

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